Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2AM-DOH1323

Due : June 30, 2020

Our file - Notre référence
CIDM# 1285081

Robin Ikkutisluk
Administrative Coordinator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0

sent via email: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada Comments on TMAC Resources Inc. 2019 Annual Report for Type A Water Licences 2AM-DOH1335 and 2AM-BOS1835, and Type B Water Licences 2BB-MAE1727, 2BB-BOS1727, and 2BE-HOP1222, for the Hope Bay Project

Dear Ms. Ikkutisluk,

Thank you for your April 30, 2019 invitation to review the referenced 2019 Annual Report for the Hope Bay Project. Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the report and its attachments pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. The results of our review are provided in the enclosed memo for the Nunavut Water Board's consideration.

If there are any questions or concerns, please contact me at (867) 975-4282 or by e-mail at bridget.campbell@canada.ca.

Sincerely,

Bridget Campbell
Water Resources Coordinator

Canada

Technical Review Memorandum

Date: June 30, 2020

To: Robin Ikkutisluk – Licensing Administrator, Nunavut Water Board

From: Bridget Campbell – Water Resources Coordinator, CIRNAC

Subject: **Crown-Indigenous Relations and Northern Affairs Canada Comments on TMAC Resources Inc. 2019 Annual Report for Type A Water Licences 2AM-DOH1335 and 2AM-BOS1835, and Type B Water Licences 2BB-MAE1727, 2BB-BOS1727, and 2BE-HOP1222, for the Hope Bay Project**

Region: ☒ Kitikmeot ☐ Kivalliq ☐ Qikiqtani

A. BACKGROUND

On April 30, 2019, the Nunavut Water Board (NWB) requested comments on TMAC Resources Inc.'s (TMAC) 2019 Annual Report for Operations at the Hope Bay Project. It is entitled *Hope Bay Project 2019 Nunavut Water Board Annual Report*, and is dated March 2020.

The Hope Bay Belt Project includes four gold mines with activities covered under TMAC Type A Water Licences 2AM-DOH1323 (Doris, Madrid North, and Madrid South) and 2AM-BOS1835 (Boston), two advanced exploration sites covered under Type B Water Licences 2BB-MAE1727 (Madrid) and 2BB-BOS1727 (Boston), and surface exploration covered under the Type B Water Licence 2BE-HOP1222 for 2018 (Hope Bay Region). The 2019 Annual Report covers the activities under all licences.

The 2019 Annual Report was submitted in conjunction with a number of Monitoring Reports and updated management plans. These documents are listed in Table 2 under Section B. A summary of CIRNAC recommendations can be found in Table 1. Review comments for the 2019 Annual Report are provided in Section C.

Table 1: Summary of Recommendations

Recommendation	Subject
R-01	Cyanide Monitoring
R-02	Management of Cyanide Concentrations
R-03	Water Volume Transferred from Sediment Control Pond to TIA
R-04	Quantities of Tailings Deposited in 2019
R-05, R-06	Quantity and Management of Detoxified Tailings Filtrate
R-07	Verification of Closure Design Performance
R-08	Construction Monitoring and Reporting
R-09	Management Plans Updated in 2020

B. DOCUMENTS REVIEWED

The following table (Table 2) provides a summary of the documents reviewed.

Table 2: Documents Reviewed

Document Title	Author, File No., Date
Hope Bay Project 2019 Nunavut Water Board Annual Report	TMAC Resources Inc., 03-2020
Appendix A: Concordance Table	TMAC Resources Inc., 03-2020
Appendix B: NWB Forms	TMAC Resources Inc., 03-2020
Appendix C: Site Layouts	SRK Consulting (Canada) Inc. & TMAC Resources Inc., 03-2020
Appendix D: Water Licence(s) Monitoring Data	TMAC Resources Inc., 03-2020
Appendix E: Doris Mine Annual Water and Load Balance Assessment – 2019 Calendar Year	SRK Consulting (Canada) Inc., 26-03-2020
Appendix F: 2019 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid Mines, Hope Bay Project	SRK Consulting (Canada) Inc., 03-2020
Appendix G: 2019 Waste Rock and Ore Monitoring Report, Boston Camp, Hope Bay Project	SRK Consulting (Canada) Inc., 03-2020
Appendix H: Hope Bay Project Spill Contingency Plan (TMAC, March 2020)	TMAC Resources Inc., 03-2020
Appendix I: Hope Bay Project Incinerator Source Emissions Testing 2019	Nunami Stantec Limited, 20-12-2019
Updated Management Plans not included in 2019 Annual Report	
Hope Bay Project Emergency Response Plan	TMAC Resources Inc., 03-2020
Hope Bay Project Spill Contingency Plan	TMAC Resources Inc., 03-2020
Hope Bay Project Quality Assurance Quality Control Plan	TMAC Resources Inc., 03-2020
Hope Bay Project Doris-Madrid Water Management Plan	TMAC Resources Inc., 03-2020

C. RESULTS OF REVIEW

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) appreciates the work TMAC put in to the 2019 Annual Report. Our general comment is that requirements are covered and the information provided is clear. The following comments and recommendations are provided for the Nunavut Water Board's consideration.

1. Cyanide Monitoring

Comment:
CIRNAC commends TMAC on their aquatic effects monitoring work and reporting; the 2019 Aquatic Effects Monitoring Program (AEMP) Report (ERM Consultants Canada Ltd., March 2020) is thorough and provides clear discussions of the parameters measured. CIRNAC agrees with the parameters which were identified as warranting close monitoring; arsenic in sediment at Patch Lake and under-ice ammonia in Doris Lake.

CIRNAC notes that the AEMP does not include reported values for free cyanide or total cyanide, both included in the list of water quality variables of Table 3.2-2 of the Aquatic Effects Monitoring (AEM) Plan (TMAC Resources Ltd., October 2018).

Recommendation:
(R-01) CIRNAC recommends that TMAC clarify why cyanide concentrations are not reported or discussed in the AEMP.

2. Management of Cyanide Concentrations

Comment:
The 2019 Water and Load Balance Assessment (Appendix E) clearly explains adjustments made to the Water and Load Balance model. Site data were used to update cyanide removal rates and degradation paths.

CIRNAC notes that the final remarks state TMAC is actively taking steps to manage two of the four parameters identified as being of concern: total suspended solids and unionized ammonia. A third parameter, copper, will be monitored throughout 2020. No specific actions are included for the fourth parameter of concern, cyanide.

Table 15 (page 16) states "Measured cyanide concentrations have demonstrated that cyanide readily undergoes degradation in the Doris TIA (tailings impoundment area) during the open water season. TMAC will not discharge water that is above total cyanide limits."

Recommendation:
(R-02) CIRNAC recommends that TMAC clarify how they plan to manage cyanide concentrations which are predicted to increase above the Metal and Diamond Mining

Effluent Regulations (MDMER) limit in 2023. If this plan includes holding water in the Doris TIA until cyanide degrades, TIA capacity should be discussed.

3. Water Volume Transferred from Sediment Control Pond to TIA

Comment:
The reported volume of water transferred from the sediment control pond (ST-1) to the Tailings Impoundment Area (TIA) differs between the Water Licence(s) Monitoring Data (Appendix D) and the Doris Mine Annual Water and Load Balance Assessment (Appendix E). Table D1-2 of Appendix D states a cumulative volume of 205,486 m^3 for 2019. Table 3 of Appendix E states a total of 120,000 m^3 for 2019.

Depending on the pond water chemistry, a 70% increase in volume could potentially change the findings of the Water and Load Balance Assessment.

Recommendation:
(R-03) CIRNAC recommends that TMAC clarify the volume of water transferred from the sediment control pond to the TIA and if it has been adequately incorporated into the Water and Load Balance Assessment.

4. Quantities of Tailings Deposited in 2019

Comment:
In Section 8 of the Hope Bay 2019 NWB Annual Report main document, Geochemical Studies, it was stated on page 8-4 that: “(F)lotation tailings deposition in the Doris TIA commenced on January 20, 2017. A total of 573,868 t (dry weight) of flotation tailings were deposited in the TIA in 2018.”

It is stated on page 8-5 that “(I)n 2018, a total of 18,831 t (dry weight) of detoxified tailings were placed as backfill in Doris Mine underground stopes.”

Monitoring occurred during 2019 at monitoring stations TL-6 (flotation tailings) and TL-7a (detoxified tailings solids), and details are provided in appendices D (Water Licence(s) Monitoring Data), F (2019 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid, Hope Bay Project), and G (2019 Waste Rock and Ore Monitoring Report, Boston Camp, Hope Bay Project).

It is not clear if any quantities of flotation tailings were placed in the TIA and if any quantities of detoxified tailings were placed in the underground stopes in 2019.

Recommendation:
(R-04) CIRNAC recommends that TMAC clarify the quantities of flotation tailings placed in the TIA and quantities of detoxified tailings solids placed in the underground stopes in 2019.

5. Quantity and Management of Detoxified Tailings Filtrate

Comment:
Section 8.1.2.4 of the Hope Bay 2019 NWB Annual Report main document summarized the chemistry of the detoxified tailings filtrate (monitoring station TL-7b). The quantity of the detoxified tailings filtrate produced in 2019 was not provided, and it is not clear from the report how the filtrate was managed.

Recommendation:
(R-05) CIRNAC recommends that TMAC clarify the quantity of detoxified tailings filtrate that was placed in the TIA in 2019.

(R-06) CIRNAC recommends that TMAC clarify how the detoxified tailings filtrate was managed in 2019.

6. Verification of Closure Design Performance

Comment:
Section 13 of the Hope Bay 2019 NWB Annual Report main document describes progressive reclamation and closure of the Doris Crown Pillar Recovery Trench. The section describes backfilling the hole, the placement of geochemically stable rock as a cap, and surficial grading to reduce the flow of contact water into the environment. Design measures were implemented according to recommendations based on thermal modeling conducted by SRK Consulting. These measures were implemented to promote physical, chemical, and thermal stability of the site. CIRNAC encourages TMAC to continue implementing progressive reclamation whenever possible.

One advantage of progressive reclamation during operations is that it provides an opportunity for the licensee to verify that the closure design is performing as intended. It is not clear if, or how, the performance of the cover will be monitored and the performance of the closure design verified.

Recommendation:
(R-07) CIRNAC recommends that TMAC provide clarification regarding how TMAC plans to verify that the closure design is performing as intended.

7. Construction Monitoring and Reporting

Comment:
Section 3 of the Hope Bay 2019 NWB Annual Report main document outlines construction activities carried out at the Hope Bay Project site during 2019. A Construction Summary Report, titled Hope Bay Project: Doris and Madrid 2019 Construction Summary Report (SRK Consulting, April 1, 2020), was submitted to the NWB in April and provides post-construction information on the following structures:

- Madrid South All-Weather Road (from 0 to 1 km);
- Madrid North Contact Water Pond (CWP);

- Madrid North Waste Rock Pile (WRP);
- Madrid North Portal Pad; and
- Naartok East Overburden Stockpile.

This Construction Summary Report does not include all of the construction items listed in Section 3 of the Hope Bay 2019 NWB Annual Report, nor does it include progressive reclamation work at the Doris Crown Pillar Recovery Trench. A construction summery report would be helpful for CIRNAC inspectors to evaluate the closure work.

Further, CIRNAC commented on the 2018 Annual Report (CIRNAC, August 15, 2019) and recommended that future construction reports mention if compaction tests and sieve analysis are done during construction. Information regarding whether or not compaction tests and sieve analyses were done during construction was not provided in the Construction Summary Report (SRK Consulting, April 1, 2020), nor were these tests mentioned in the Hope Bay 2019 NWB Annual Report main document.

Recommendation:
(R-08) CIRNAC recommends that a Construction Summary Report and/or Construction Monitoring Report be submitted for the following items which were constructed in 2019 when this information becomes available, and that, where applicable, the reports mention whether compaction tests and sieve analysis are done during construction:

- Roberts Bay Discharge System (RBDS);
- Underground mine dewatering and Tailings Impoundment Area (TIA) discharge pipelines and pumping infrastructure;
- The 5 million litre fuel tank; and
- Reclamation works and cover placement for the Doris Crown Pillar Recovery Trench.

8. Management Plans Updated in 2020

Comment:
In Section 12 of the Hope Bay 2019 NWB Annual Report main document, TMAC it is stated that the following management plans have been updated in March 2020:

- Hope Bay Project Emergency Response Plan;
- Hope Bay Project Spill Contingency Plan;
- Hope Bay Project Hazardous Waste Management Plan;
- Hope Bay Project Quality Assurance Quality Control Plan; and
- Hope Bay Project Doris-Madrid Water Management Plan.

CIRNAC reviewed these plans and has no concerns with the content of the updates.

The following recommendations regarding management plans, made by CIRNAC in 2019 pertaining to the 2018 Annual Report (CIRNAC, August 15, 2019), have been implemented by TMAC to the satisfaction of CIRNAC:

- CIRNAC-8 Re: Hope Bay Quality Assurance and Quality Control Plan, March 2019

    - CIRNAC recommends that the photo-maps be updated to include all new sampling points, and that a footnote be written under table B1 that explains the significance of the asterisk, for clarity
- CIRNAC-9 Re: Hope Bay Project Doris-Madrid Water Management Plan, March 2019
    - CIRNAC recommends that TMAC provide justification for the removal of in-line flow meters to quantify discharge in the pumps from the 2019 revision of the Hope Bay Project Doris- Madrid Water Management Plan.
- CIRNAC-10 Re: Hope Bay Project Aircraft De-icing Management Plan, March 2019 and Hope Bay Spill Contingency Plan, March 2019
    - CIRNAC recommends that TMAC provide information regarding the procedure for disposal of glycol contaminated snow and sump water in the Spill Contingency Plan.

Of these updated management plans, only the Spill Contingency Plan was attached to the 2019 Annual Report. Attaching all updated management plans, or a link to where plans can be found, to the Annual Report in the future would help interveners in their review.

Recommendation:

(R-09) CIRNAC recommends including links to the updated management plans in the invitation for comments if the updated plans are not stored in the same folder as the annual report on the public registry.

D. REFERENCES

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). *Letter to the Nunavut Water Board Re: Crown-Indigenous Relations and Northern Affairs Canada Comments on TMAC Resources Inc. 2018 Annual Report for Water Licence 2AM-DOH1335 – Amendment No. 2, Doris-Madrid (Hope Bay) Gold Mine Project.* August 15, 2019.

ERM Consultants Canada Ltd. on behalf of TMAC Resources Inc. *Hope Bay Project 2019 Aquatic Effects Monitoring Program Report.* March 2020.

Metal and Diamond Mining Effluent Regulations, SOR/2002-222.

SRK Consulting on behalf of TMAC Resources Inc. *Hope Bay Project: Doris and Madrid 2019 Construction Summary Report.* April 1, 2020.

TMAC Resources Inc. *Hope Bay Belt Project 2018 Nunavut Water Board Annual Report.* March 2019.

TMAC Resources Inc. *Hope Bay Project Aquatic Effects Monitoring Plan.* October 2018.